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3.5.2 Products of CO₂ Hydrogenation 3.5.3 Deactivation and Regeneration; 3.5.4 Mechanisms of CO₂ Hydrogenation; 3.6 CO₂ Reforming; 3.7 Prospects in CO₂ Reduction; Acknowledgments; References; Chapter 4 Hydrogenation of Carbon Dioxide to Liquid Fuels; 4.1 Introduction; 4.2 Methanation of Carbon Dioxide; 4.3 Methanol and Higher Alcohol Synthesis by CO₂ Hydrogenation; 4.4 Hydrocarbons Through Modified Fischer-Tropsch Synthesis; 4.5 Conclusions; References; Chapter 5 Direct Synthesis of Organic Carbonates from CO₂ and Alcohols Using Heterogeneous Oxide Catalysts; 5.1 Introduction
5.2 Ceria-Based Catalysts 5.2.1 Choice of Ceria Catalysts in Direct DMC Synthesis; 5.2.2 Performances of the Ceria Catalyst in DMC Synthesis; 5.2.3 Direct Synthesis of Various Organic Carbonates from Alcohols and CO₂ Without Additives; 5.2.4 Reaction Mechanism; 5.2.5 Ceria-Zirconia Catalysts; 5.2.6 Modification of Ceria-Based Catalysts; 5.2.7 Use of Acetonitrile as a Dehydrating Agent for DMC Synthesis; 5.2.8 Use of Acetonitrile as Dehydrating Agent for Synthesis of Various Carbonates; 5.2.9 Use of Benzonitrile as Dehydrating Agent
5.2.10 Deactivation of the Ceria Catalyst in the Presence of Benzonitrile 5.2.11 Use of Other Dehydrating Agents; 5.3 Zirconia-Based Catalysts; 5.3.1 Structure and Catalytic Performance of Zirconia; 5.3.2 Modification of Zirconia Catalysts; 5.3.3 Reaction Mechanism over Zirconia-Based Catalysts; 5.3.4 Combination of Dehydrating Agents with Zirconia-Based Catalysts; 5.4 Other Metal Oxide Catalysts; 5.5 Conclusions and Outlook; References; Chapter 6 High-Solar-Efficiency Utilization of CO₂: the STEP (Solar Thermal Electrochemical Production) of Energetic Molecules; 6.1 Introduction
6.2 Solar Thermal Electrochemical Production of Energetic Molecules: an Overview

Sommario/riassunto

Recycling carbon-dioxide at the source would not only go a long way towards minimizing the emissions, but would also motivate industry leaders to take the positive approach for CO₂ reuse. Transforming Carbon Dioxide into Synthetic Fuels presents power plant engineers, process engineers, chemical engineers, electrochemists, scientists, and professors with several technologies that can be used to recycle carbon-dioxide into fossil fuel equivalent and minimize carbon dioxide emissions. The authors demonstrate how to make these conversions from alternative green energy sources, such as sola
